REMARKS

Claims 1 to 26 are pending. No claims are allowed. However, claims 4, 14 and 20 are objected to. Claim 2, 3, 12, 13 and 18 to 20 are cancelled and claim 26 is new.

1. Claims 8, 18 and 19 are rejected under 35 USC 112, second paragraph. Claim 8 has been amended to clarify what is meant by "built in one of a case-negative design, a case-positive design and a case-neutral design".

Claims 18 and 19 have been cancelled.

2. Claims 1 to 3, 8 to 10 and 17 to 25 are rejected under 35 USC 102(e) as being anticipated by Kweon et al. (U.S. Patent No. 6,372,385). Kweon et al. '385 describes a positive electrode for a lithium secondary battery. The positive electrode material is produced from a crystalline powder or semi-crystalline powder of $LiA_{1-x-y}B_xC_yO_2$ coated with a metal alkoxide sol and then heated. Preferably, a nickel salt such as nickel hydroxide, nickel nitrite, or nickel acetate is the A metal salt, the B metal salt is preferably a cobalt salt such as cobalt hydroxide, cobalt nitrite or cobalt carbonate, and the C metal salt is aluminum hydroxide or strontium hydroxide. This produces a lithiated active material coated with a metal oxide on its surface.

In contrast, independent claims 1 and 17 have been amended to set forth that the cathode comprises a core of a first cathode active material provided with a coating of β-phase SVO, γ-phase SVO, MnO_2, and mixtures thereof. Support for this is found in the specification at page 9, lines 9 to 11 and

specifically for ε-phase SVO coated with a γ-phase SVO at Example III beginning on page 19. These materials denote the presently claimed cell as being of a primary chemistry, which is markedly different than one of a secondary chemistry.

The subject matter of dependent claims 4 and 20 has been indicated to be allowable if re-written into independent claim form. This means that the combination of a ε-phase SVO core having its individual particles provided with a coating of γ-phase SVO is a patentable aspect of amended independent claims 1 and 17. Furthermore, it is well known from the literature that MnO_2 has a lower capacity than ε-phase SVO (see attached table re-printed from page 297 of K.J. Takeuchi et al./Coordination Chemistry Reviews 219-221 (2001) 283-310) as well as an inherently lower rate capability than ε-phase SVO. However, MnO_2 does not display voltage delay, making it a suitable coating material for ε-phase SVO particles according to the applicants' presently claimed invention. Likewise, β-phase SVO has a lower capacity than ε-phase SVO and is useful in lowering undesirable voltage delay.

Table 1
The gravimetric capacity of cathode materials used in lithium and lithium ion batteries tabulated from the literature

Cathode material	Capacity (mAh g^{-1})
CF_x	860 [77]
SVO ($Ag_2V_4O_{11}$)	315 [52]
MnO_2	308 [78]
TiS_2	226 [79]
$LiMoO_2$	199 [79]
$LiNiO_2$	160 [80]
$LiNi_{0.5}Co_{0.5}O_2$	147 [80]
$LiCoO_2$	131 [80]
$LiMn_2O_4$	123 [80]
$LiWO_2$	120 [79]

In that respect, the amended independent claims are now directed to a specific type of primary electrochemical cell that is neither taught by, nor obvious in light of, Kweon et al. '385. Claims 8 to 10 and 21 to 25 are patentable as hinging from allowable base claims. Claims 2, 3 and 18 to 20 have been cancelled, which renders this rejection moot with respect to them.

Reconsideration of this rejection is requested.

3. Claims 1, 2, 5 and 8 to 10 are rejected under 35 USC 102(e) as being anticipated by Takeuchi et al. (U.S. Patent No. 6,458,487). The Takeuchi et al. patent describes a positive electrode active material body for a secondary cell. The positive electrode has a core composition of $Li_{1+x}Mn_{2-x-y}M_yO_4$, wherein M devotes at least one element selected from elements other than Mn, alkaline metal elements and alkaline earth metal elements, $0 \leq x \leq 0.2$ and $0 \leq y \leq 0.3$; and a cover layer compound of a metal oxide containing at least Mn and Li formed on a surface of the positive electrode active body. As described at column 5, lines 25 to 32 the cover layer effectively separate the electrolyte from the active material core. This prevents Mn ions constituting the surface layer of the active material core from being dissolved into the electrolyte. At column 6, lines 31 to 44 Takeuchi et al. state that when the cover material is a composite of lithium, it promotes diffusive movement of lithium ions during both charge and discharge battery reactions. "That is, generally, the cover layer containing no lithium ion functions as a layer to obstruct the diffusion of lithium ion. However, when lithium ion sites are previously provided in the cover layer, the diffusion of

lithium can be smoothly performed." The stated benefit is the maintenance of acceptable cycling characteristics at high temperature.

As previously discussed, independent claim 1 has been amended to set forth that the cathode comprises a core of a first active material provided with a coating of β-phase SVO, γ-phase SVO, MnO_2, and mixtures thereof. None of these cover materials are "a metal oxide which is composited with lithium". This means that a careful reading of the Takeuchi et al. patent would not have lead one skilled in the art to the applicants' presently claimed invention. For one, the cover materials in amended independent claim 1 do not contain lithium.

In that light, amended independent claim 1 is now allowable over the Takeuchi et al. reference. Claims 5 and 8 to 10 are patentable as hinging from an allowable base claim. Claim 2 is cancelled.

Reconsideration of this rejection is requested.

4. Claims 1, 2, 5 and 7 to 10 are rejected under 35 USC 102(e) as being anticipated by Koga et al. (U.S. Patent No. 6,534,217). Koga et al. describes a positive electrode for a secondary battery. The positive electrode contains a center portion of a lithium composite oxide such as $LiMn_2O_4$ provided with a coating portion of a conductive oxide such as ITO or SnO_2. The effect is that "elution of the positive electrode material into the electrolyte solution is suppressed, and deposition of the reaction product on the surface of the positive electrode 21 caused by repetition of charging and discharging is prevented" (see column 6, lines 30 to 53). However, as pointed out at column 11, lines 53 to 62, the center portion can also be of

MnO_2, MoO_3 or V_2O_5 in place of $LiMn_2O_4$.

Nonetheless, this prior art patent does not describe any of the presently claimed core or coating materials. The reason is that Koga et al. were concerned with a secondary, rechargeable cell, and the applicants' presently amended claims are directed to a primary cell. These are fundamentally different electrochemical systems.

Accordingly, amended independent claim 1 is neither anticipated by, nor obvious in light of, Koga et al. Claims 5 and 7 to 10 are patentable as hinging from an allowable base claim. Claim 2 is cancelled.

Reconsideration of this rejection is requested.

5. Claims 1 to 3, 5, 6, 8 to 10, 17 to 19 and 21 to 25 are rejected under 35 USC 102(e) as being anticipated by Kweon et al. (U.S. Patent No. 6,737,195). Kweon et al. '195 describe a secondary cell having a $LiNiMnO_2$-based material as a positive active material. This active material is intended as a replacement for the commonly used $LiCoO_2$ which, while exhibiting good electrochemical properties, is high in cost. The $LiNiMnO_2$-based material has a metal oxide or composite metal oxide layer on its surface to improve charge-discharge characteristics. The metal in the metal oxide or composite metal oxide is selected from Mg, Al, Co, K, Na, Ca, Si, Ti, U, Sn, Ge, Ga, B or As, aluminum being preferred.

In that respect, this patent reference does not describe any of the presently claimed core or coating materials. Again, the reason is that Kweon et al. '195 were concerned with a secondary, rechargeable cell. Accordingly, amended independent claims 1 and 17 are neither anticipated by, nor obvious in light

of, Kweon et al. '195. Claims 5, 6, 8 to 10 and 21 to 25 are allowable as hinging from patentable base claims. Claims 2, 3 and 18 to 19 are cancelled.

Reconsideration of this rejection is requested.

6. Claims 11 to 13, 15 and 16 are rejected under 35 USC 103(a) as being unpatentable over Kweon et al. '385 or Kweon et al. '195 or Takeuchi et al. or Koza et al. Independent claim 11 has been amended to include a portion of the subject matter of objected to claim 14. Accordingly, it is believed to be allowable. Claims 15 and 16 are patentable as hinging from an allowable base claim. Claims 12 and 13 are cancelled.

Reconsideration of this rejection is requested.

7. Claims 4, 14 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. As previously discussed, a portion of the subject matter of claim 14 has been incorporated into amended independent claim 11. Likewise, a portion of objected to claims 4 and 20 has been incorporated into amended independent claims 1 and 17, respectively. These amended independent claims are also believed to be patentable.

Allowance of amended independent claims 1, 11 and 17 is requested.

8. New independent claim 26 is directed to an electrochemical cell comprising the various cathode active materials set forth in dependent claim 2 coated with one of the group of γ-phase SVO, β-phase SVO, MnO_2, and mixtures thereof. Support for this is found at page 3, lines 7 to 19.

It is believed that claims 1, 4 to 11, 14 to 17 and 21 to 26 are now in condition for allowance. Notice of Allowance is requested.

Respectfully,

Michael F. Scalise
Reg. No. 34,920

Greatbatch, Inc.
9645 Wehrle Drive
Clarence, New York 14031
(716) 759-5810
September 19, 2006